

LASER COMPONENTS expands

Production Facilities for PbS/PbSe Detectors Have Opened

LASER COMPONENTS now manufactures PbS and PbSe detectors in house. This development was announced in January, and the first detectors were introduced at Photonics West in San Francisco.

The production facility is an expansion of the LASER COMPONENTS Detector Group in Phoenix, Arizona. In addition to avalanche photodiodes, both InGaAs detectors and IR emitters are developed and manufactured here. Background information can be taken from the following interview.



"We have as many IR core technologies available as possible to meet customer demands."

Patrick Paul,
CEO, LC Germany

How did LASER COMPONENTS (LC) end up with such a comprehensive range of IR components?

Patrick Paul: LASER COMPONENTS has been known as a specialist for IR components since its founding in 1982. The collective know-how is enormous. Our customers profit worldwide from our in-house production facilities. We were able to enlist specialists that are much more familiar with the market than many others and incorporate their expertise in development and production.

"Our advantage: ISO-certified assembly and test options well equipped with hardware and software."

Dragan Grubisic,
LC Detector Group



Why do you offer competing IR technologies?

PP: Because we offer IR detectors based on very different technologies, our customers are almost always able to find an ideal solution. Gas measurements can, for example, be carried out with both PbS/PbSe and pyroelectric detectors. Depending on what exactly needs to be measured, one technology is generally ideal. Very few other manufacturers can offer the advantage of such independent consultation – and we are one of them; in fact, we are even able to manufacture custom products.

Mr. Grubisic, you are managing director of the Detector Group, which has expanded the most in the past few months. You introduced the production of lead selenide and lead sulfide detectors for the first time in January. Are the products already available?

Dragan Grubisic: Yes. Production has already begun; in fact, we introduced the first detectors at Photonics West. Arizona State University, ASU, has paved the way for us to develop this technology and catapult us into the ranks as technology leader. We developed all of the new detectors and state-of-the-art manufacturing processes at ASU. This combination enables us to reproducibly manufacture high-quality PbS and PbSe detectors.

"Our products offer the best performance that I have ever seen in PbSe detectors."

Larry Johnson,
LC Detector Group



InGaAs PIN and x-InGaAs photodiodes are also produced at your facility.

DG: We developed the first InGaAs PIN photodiodes in 2012. We offer an attractive price/performance ratio and an open ear for customer requests, which are in demand on the market. We are also proud of our production of multiplexed x-InGaAs arrays – only a very few companies have this capability; in fact, we were able to improve this state-of-the-art technology. At the LASER. World of PHOTONICS, we will be introducing these line arrays in a workshop.

Webcode **N02-03 1**



Dear Reader,

Laser Components Nordic has seen its first New Year since we opened our doors in August last year. I am very pleased to say that our first months in business have been very productive and that the outlook for 2015 is very bright indeed. This would not have been possible without the positive response from customers all over the Nordic region. I would like to thank you all for your part in making Laser Components Nordic successful. We appreciate your business and hope that we can continue to contribute to developing your technology with our state-of-the-art components.

In this issue, you will be able to read about Laser Components' new production facilities for PbS/PbSe detectors. Production has already begun and the first detectors were introduced at Photonics West. Moreover, you will find information about many new products manufactured in-house, as well as by our partners. Laser Components Nordic also represents a number of external suppliers. We will introduce them and their products in these newsletters, so be sure to check if there is anything of particular interest for your company. The first one to be introduced is Aerotech Ltd. (page 7), the technology leader in motion control and positioning systems. If you have any needs for high precision motion control, please don't hesitate to contact us!

Also in this issue, we announce our participation in the conference Northern Optics & Photonics 2015, which will take place June 2–4 in South-Eastern Finland. We hope to see you there!

Yours,

Mikael Winters



UVA LEDs in Industrial Applications

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The fact that LEDs are used in smartphones and tablets, as well as different types of displays and sensors, should be well known. It may not be as well known that they are widely used behind the scenes. In manufacturing processes, LEDs with a special wavelength range (i.e., UVA LEDs with wavelengths from 365 nm to approximately 400 nm) play a role.

UV LEDs Used to Cure Touchscreens

UVA LEDs are used to cure adhesives; for example, touch-sensitive screens are assembled by bonding together the display glass, touchscreens, and LCD displays across the entire surface.

When smartphones first came out, the touch-screen and display were stacked on top of each other without a surface adhesive – air was sealed between the layers. As the screens got larger, framing and pressure distribution became more difficult.

Full-surface adhesion became an integral part of production. This has made it possible to produce flatter and flatter smartphones, as well as to produce and assemble them more quickly and in an uncomplicated manner [1].

Curing of Other Adhesives

UVA LEDs are also used to cure DVDs, automotive electronics, and cabin equipment in airplanes. Another prominent example is the curing of laminate flooring.

Also Ideal for Varnishes and Printing Inks

In addition to adhesives, varnishes and printing inks also need to be cured. These substances start out as a liquid and are solidified via a chemical reaction brought about within a matter of seconds by the high-energy radiation of UVA LEDs [2]. UVA LEDs are also used in the dental industry to cure composite fillings in teeth. Activating an initiator at a wavelength of from 300 nm to 450 nm triggers the polymerization of the composite and the curing of the filling [3].

UV LEDs in lieu of UV Lamps

– The Advantages:

LEDs continue to replace UV lamps and flash lamps in these applications. The reasons for this are multifaceted:

- UVA LEDs have a longer lifetime, typically >10,000 hours
- LEDs feature short switching times because they do not need to warm up
- LEDs require very little space
- The heat radiation of UV LEDs is minimal

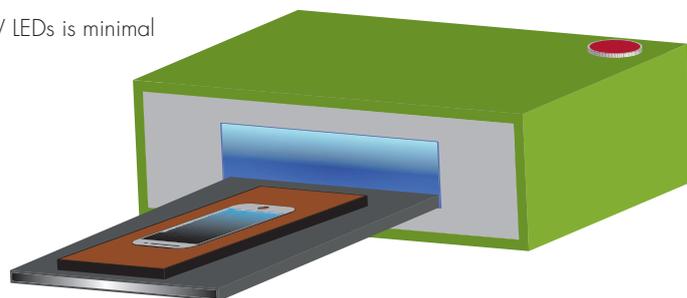
UVA LEDs up to Four Watts

We offer UV LEDs used in the curing of adhesives, varnishes, and printing inks, as well as in special illumination systems.

Whether packaged in an SMD with or without a lens or as a chip, we have the following wavelengths available as part of our product range: 365 nm, 385 nm, 395 nm, and 405 nm.

With an output power of up to 4 W, a long lifetime, and a compact design, UV LEDs form the basis of technologically-advanced high-end products in industrial applications.

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[1] <http://www.iphone-support.de/wissenswiki/display/vollverklebung/index.html> [2] <http://de.wikipedia.org/wiki/Stahleinh%C3%A4ftung>, Version 02.02.2015
[3] http://de.wikipedia.org/wiki/Komposit_%28Zahnmedizin%29, Version 02.02.2015

IG22 – Extended InGaAs Detector

Now Available as Line Array

We present the IG22X0103L28-256TEC, an x-InGaAs line sensor for SWIR spectroscopy.

This array has 256 pixels @ 30 μm x 250 μm each with a pitch of 50 μm . In cooled operation, the spectral range is covered up to 2.1 μm (20% point).

Why you should test it!

The reason to integrate a sophisticated extended InGaAs detector in this complex product lies in its technological advantages.

These advantages are detailed as follows:

1. Auto-zero function for dark current reduction.

The dark current in photodiodes depends on the bias voltage applied. Thus, voltage-free operation is ideal; realistically, however, the input offset of the amplifier acts as bias voltage. In the IG22 array, this undesired voltage is reset to zero after each readout.

2. Amplification. The amplification can be finely adjusted at eight levels, individually per pixel. This is practical because the middle of the line is often illuminated more strongly than its edges. Thus, the optimal dynamic range per pixel can be utilized.

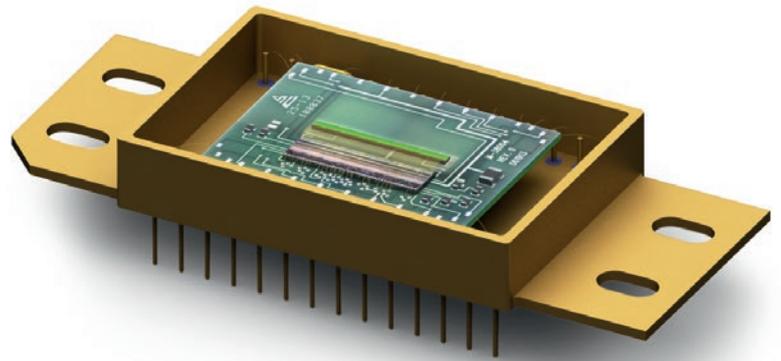
3. This array is designed with a high linearity. The aim is a value of 99.9%.

4. Optimized thermal design. This array, which is equipped with a two-stage Peltier element, achieves a ΔT of 65 K (i.e., it can be cooled from room temperature to -40°C).

5. Integrated low-pass filter. An anti-alias low-pass filter is integrated before the sample-and-hold circuit.

Furthermore, this array is equipped with all commercial standard features, such as correlated double sampling (CDS). Complete evaluation electronics are available with a USB interface.

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New Development Now Available Commercially

Numerous Advantages: Pyroelectric LTO Detectors in Current Mode

We present the first new developments introduced by our LASER COMPONENTS Pyro Group production facility: Pyrodetectors used in current mode.

The Advantages!

In current mode, the signal is relatively strong on a low offset with a consistent temperature dependency across a wide range. Simply said, this combination is THE secret to a successful approach.

Alan Doctor, pyrodetector visionary and managing director at LC Pyro Group has had current mode in his sights for years and transformed it into marketable products. In addition, the new product range reflects new market trends.

New Products

The initial products consist of LiTaO_3 detectors in a TO-39 housing – as single and dual sensors. They are available both with and without an additional blind element. The purpose of the blind element is temperature fluctuation compensation (TFC), as well as higher internal amplification. Wherever reasonably possible, we integrated microphonic reduction in the detectors.

• LT1100X2020

Single-channel detector with an active area of $2.0 \times 2.0 \text{ mm}^2$ for high frequencies of up to 5 kHz

• LT1150M3030

Single-channel detector with an active area of $3.0 \times 3.0 \text{ mm}^2$, low microphony, and single supply (i.e., low power consumption)

• LT2110M2020 - High End Version

Single-channel detector with an active area of $2.0 \times 2.0 \text{ mm}^2$, TFC, and low microphony

• LT1240X1810

Dual-channel detector with $1.8 \times 1.0 \text{ mm}^2$ per active area and single supply

A wide range of filters makes it possible to configure a suitable detector for your application.

Test the first products of the series and expect to see more new detectors!

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LASER



Arima Presents New Product Line

Superluminescence Diodes

The design of a superluminescence diode is equivalent to a laser diode without a resonator. Its radiation is based on an amplified spontaneous emission and offers the brightness of laser diodes combined with the low coherence length of LEDs. This equals a larger optical bandwidth of the emitted radiation.

Similar to edge-emitting laser diodes, SLEDs have a p-n junction and are operated under forward bias. Unlike edge emitters, SLEDs do not have a resonator; thus, a standing wave cannot form. This leads to the aforementioned spontaneous amplified emission.

Arima Lasers now also offers SLEDs at 670 nm and 830 nm with an output power of up to 10 mW.

Fields of Application

These diodes, which are assembled in the proven 5.6 mm TO housing, are successfully used in optical coherence tomography, fiber sensor technology, optical measurement technology, and as illumination sources for imaging methods in medical technology.

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Standard Modules and Custom Solutions

488 nm FLEXPOINT® Laser Modules

The FLEXPOINT® laser module series now includes dot and line lasers with 488 nm. Therefore, in addition to 405 nm and 450 nm, a third wavelength is available in the blue spectral range.

Depending on the beam profile, the output power amounts to up to 40 mW. Due to the narrow-banded emission of 488 nm \pm 2 nm, these laser modules are optimally suited for fluorescence applications, spectroscopic applications, and particle measurements. Further applications include biomedical and medical technology.

If our standard modules do not suit your application 100%, we will work with you to develop an appropriate laser module.

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OSRAM Opto Semiconductor is a new Partner for Laser Diodes

Laser diodes, which emit in the visible range, from OSRAM Opto Semiconductors are available at LASER COMPONENTS.

These powerful laser diodes in the blue and green spectral ranges are used in laser projection, laser shows, stage lighting, biomedical and medical technology, measurement technology, and holography.

Products with the following specifications are available:

- 450 nm: 80 mW und 1,6 W
- 488 nm: 60 mW
- 510 – 530 nm: 30 mW – 120 mW

Standard laser diodes are generally available in stock. They have a TO-56 housing and, on an optional basis, an integrated monitor photodiode for power control.

These diodes can be spectrally measured and selected at our facility upon request.

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Beam Profile Measurement

Unbelievable Sensor Size: Beamage 4M

Gentec-EO has expanded its beam profile camera family by an additional member: the Beamage-4M.

With 5.5 $\mu\text{m}/\text{pixel}$, it offers the same high resolution as the Beamage 3.0 but at almost double the active sensor area!

11.3 mm x 11.3 mm Sensor Area

A total of 4.2 million pixels are available on a CMOS sensor area of 11.3 mm x 11.3 mm to measure beam profiles in the wavelength range from 350 nm to 1,150 nm. With the help of interchangeable filters, this range can be expanded from 250 nm to 1,350 nm. There are plenty of accessories available, too: This includes a wide selection of IR and UV converters and various optical attenuators for use in powerful laser systems.

This equipment leaves nothing to be desired.

Thanks to the fast USB 3.0 connection, frame rates of up to 6 fps can be achieved on a PC at the full 4.2 megapixels. An external trigger input and a powerful and user-friendly software package are included as part of this equipment.

Free Software Updates

This is not the case everywhere but with Gentec-EO products it is a standard: Software updates are available to customers for free.

Extraordinary Requirements?

Does your laser have a diameter of two meters? This problem can also be solved with the Beamage family. We will assist you in your selection.

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Sealed in Any Case

Hermetic Feedthroughs for Fiber Optics

To use optical fibers in pressure chambers or vacuum applications, they have to be guided from the outside into the inner environment. Feedthroughs that can withstand high pressure and also feature high temperature stability are used for this purpose. We offer a new range of products for multi-mode, single-mode, and PM fibers that are suited for high-vacuum (HV), ultrahigh-vacuum (UHV), and high-pressure applications.

Direct Fiber Feedthroughs

Direct fiber feedthroughs without a connection option at the flange make it possible to achieve high packing densities at a good price/performance ratio. Two versions are available:

- Pressure-tight feedthroughs that are water-proof and airtight
- HV and UHV-tight fiber feedthroughs

Connector-based Feedthroughs

These versions are particularly flexible since the fibers outside and inside the chamber are interchangeable. This is particularly advantageous when using sensitive fibers or during maintenance work inside the chamber in which the connectors can be separated easily. This range of products consists of

- HV and UHV-suitable connector and coupler-based solutions.

Product Features

Our feedthroughs are available at different pressure levels from 10⁻⁵ to 10⁻¹² mbar l/s and for different ISO flanges (e.g., KF and CF flanges). For baking-out purposes, temperatures of up to 180°C can be specified.

In addition to standard flanges, custom assemblies can also be provided. The mechanical and optical design is customized to meet your requirements. A hermetic seal is also available for gases and liquids.

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Low Insertion Loss at High Return Loss

Fiber Optic Rotary Joints for SM Fibers

The new optical single-channel rotary joints were developed for single-mode fibers with the requirement "low transmission loss at a simultaneously high return loss." In an operating temperature range from -40°C to +85°C, the transmission loss for the wavelengths 1310 nm and 1550 nm is a maximum of 1.0 dB, and the return loss is 55 dB.

These very good optical parameters are achieved through the use of fiber optic collimators in combination with a software-controlled alignment method and a special adhesive technique. During alignment, the light beams emitted by the collimators are aligned with the mechanical rotating axis. The coupling losses

between two collimators primarily depend on whether the angle was misaligned on either side. Through the use of special ball bearings

Optical coating of the collimators allows operation in the wavelength range from 1270 nm to 1650 nm. All rotary joints are available for delivery equipped with standard connectors for SM applications.

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and individual high-precision mechanical components, the required angular accuracy of the rotary joints can be guaranteed.



Laser Components Participation

Northern Optics & Photonics 2015

In the International Year of Light and Light-Based Technologies 2015 it is our great pleasure to announce our participation in the next edition in the series of Northern Optics conferences that brings together optical scientists from the Nordic and Baltic countries. Northern Optics & Photonics 2015 (NOP 2015) will be arranged on 2–4 June 2015 near the city of Imatra in South-Eastern Finland. The conference is organized by Photonics Finland in conjunction with the Institute of Photonics (UEF, Joensuu), Lappeenranta University of Technology (LUT, Lappeenranta) and sponsored by optics/ photonics societies of Sweden, Denmark, Norway, and Baltic countries.

Because of extensive growth of photonics industries in the Nordic and Baltic countries and the formation of dedicated industrial photonics clusters in many countries, NOP 2015 has a separate industrial program committee besides the academic one and contains parts devoted specially to optics and photonics industries. Laser Components will contribute to the industrial session by a presentation titled:

“High performance LiTaO₃ and DLaTGS pyroelectric detectors and their applications”
We will moreover be a part of the industrial exhibition.

The conference deals with all aspects of optics and photonics from basic research to manufacturing and applications. It contains plenary, invited, contributed, and poster presentations.

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Northern Optics & Photonics (NOP2015)



<http://www.photonics.fi/en/nop2015/>

New Supplier at Laser Components Nordic

Official Distributor For Aerotech, Inc.

We are happy to announce that Laser Components Nordic is now an official distributor for Aerotech, Inc. in the Nordic region! Aerotech designs and manufactures the highest performance motion control, positioning tables/stages, and positioning systems for customers in industry, government, science, and research institutions around the world.

Aerotech's precision motion control products provide the critical performance for today's demanding applications in markets such as medical device and life sciences,

semiconductor and flat panel, photonics, automotive, data storage, laser processing, military/aerospace, electronics manufacturing, test, assembly, research and development, and other markets requiring high precision, high throughput motion solutions.

The performance of Aerotech's products is complemented by the depth and breadth of their product line, providing customers with a one-stop supplier for a quick and efficient solution for their application.



Please contact us with your motion control needs. If you don't find a standard product suitable for your application, Aerotech's expertise and ability to provide custom motion components and systems is unmatched in the industry. From technically superior components to high performance sub-assemblies to best-in-class, highly integrated motion subsystems, Aerotech can accommodate the requirements of your application and outperform competitive solutions.

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We Invested for Your System Quality

Centricity Measurement in Substrate Production

Is the measurement of centricity in laser optics necessary or not? The more optics that are used in a system, the more important the quality of each individual lens becomes. This is because optics which have a matching reference axis and optical axis are a prerequisite for an optimal optical assembly – and only this makes it possible to achieve lossless adjustment.

In a worst case scenario, deviations in the axes could lead to an undesired heating up of the entire laser system. To ensure that you are on the safe side with our laser optics, we invested further:

We provide the centricity measurement of individual lenses.

Centering errors can be measured in transmission and reflection. To determine the centering accuracy, the tilting error of the top surface of the sample is determined in relation to the edge and the bottom surface of the lens.

The LASER COMPONENTS Quality Promise

LASER COMPONENTS manufactures spherical lenses for laser applications with the following specifications:

- Material: BK7, Fused Silica
- Diameter: 12.7 mm – 60 mm
- Radii: 12 mm to 12,000 mm or flat surfaces
- Surface quality 5/4 x 0.025
- (Scratch-dig 10-5) at a diameter of 1"
- Surface accuracy of 1/10
- (i.e., 3/0.2 for $\lambda = 546 \text{ nm}$)
- Centering: 4/3' (better than three arc minutes)



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Expansion of Product Range

Diffraction Optical Elements Made of Plastic

If diffractive optical elements are used at low and medium laser power, then it is not absolutely necessary to fall back on expensive fused silica elements because plastic elements may be sufficient.

Holo/OR offers plastic DOEs in different materials: polycarbonate, PMMA, Zeonex, and Zoner. They are produced in large quantities using an injection molding process.

Elements according to Customer Request

Plastic DOEs are used in particular in systems of mass production. For the most part, customers have optics made that feature their required specifications. Holo/OR offers inexpensive tooling and low production costs – see for yourself!

Adaptation of Existing Designs

Do you already have a DOE design that Holo/OR manufactured on a fused silica element? Insofar as physically possible, this design can be adapted to a plastic DOE design.

Existing Designs

Multi-spot DOEs and homogenizers are currently available as standard elements for the wavelengths 850 nm and 532 nm.

For Your Own Beam Analysis

For evaluation purposes, Holo/OR uses software it developed on its own. For this reason, you will be able to obtain a data file of the DOEs in the quotation phase. This file can then be integrated into your own software (Zemax or Lighttrans) for further simulations.

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